

CLAIMS

1. Controllable two-way valve device for an internal combustion engine, which device features a valve rod and at least two valve members and that can be actuated via an actuator, as well as with a housing in which one inlet or one outlet and two outlets or inlets are embodied, whereby each inlet or outlet can be connected fluidly to one or both of the outlets or inlets, characterized in that the valve rod (3) is connected in a permanent manner to the at least two valve members (4, 5, 6; 24, 25; 39, 40) that correspond with at least two valve seats (12, 17, 22; 29, 37, 38; 46, 47), whereby the at least two valve members (4, 5, 6; 22, 23; 39, 40) feature three control surfaces (11, 13, 18; 26, 27, 31; 44, 45, 48).
2. Controllable two-way valve device for an internal combustion engine according to Claim 1, characterized in that the controllable two-way valve device is a combined exhaust gas recirculation- and bypass valve device (1), whereby the inlet (8; 41) is connected fluidly to an exhaust gas recirculation channel, the first exhaust gas outlet (9; 32; 42) is connected fluidly to an exhaust gas cooler directly or via a channel (16), and the second exhaust gas outlet (10; 28; 43) is connected fluidly to a bypass channel (21, 36) via which the exhaust gas cooler can be bypassed.
3. Controllable two-way valve device for an internal combustion engine according to Claim 1 or 2, characterized in that at least one of the valve members (5; 24; 39) features a control surface (13; 27; 48) extending in the axial direction with respect to the valve rod (3).
4. Controllable two-way valve device for an internal combustion engine according to one of the previous claims, characterized in that the axially extending control surface (13; 27; 48) is embodied as a cylindrical outer jacket (14; 30; 39) whose central axis is formed by the valve rod (3).

5. Controllable two-way valve device for an internal combustion engine according to one of the previous claims, characterized in that three valve members (4, 5, 6) are arranged on the valve rod (3), which valve members interact with one valve seat (12, 17, 22) respectively, whereby a first valve member (4) governs the exhaust gas inlet (8), a second valve member (5) governs the outlet (9) to the exhaust gas cooler that is arranged between the exhaust gas inlet (8) and the outlet (10) to the bypass channel (21) and features the axially extending control surface (13), whereby the second valve member (5) can be flowed through in the axial direction, and a third valve member (6) governs the outlet (10) to the bypass channel (21).
6. Controllable two-way valve device for an internal combustion engine according to one of Claims 1 through 4, characterized in that two valve members (24, 25) are arranged on the valve rod (3), of which a first valve member (24) features one axially extending control surface (27) and one radially extending control surface (26), whereby each control surface (26, 27, 31) corresponds with a valve seat (37, 29, 38).
7. Controllable two-way valve device for an internal combustion engine according to Claim 6, characterized in that the radially extending control surface (26) of the first valve member (24) governs the exhaust gas inlet (8), the axially extending control surface (27) of the first valve member (24) governs the outlet (28) to the bypass channel (36), and a radially extending control surface (31) of the second valve member (25) governs the exhaust gas outlet (32) to the exhaust gas cooler.
8. Controllable two-way valve device for an internal combustion engine according to Claim 7, characterized in that the second valve member (25) features an axially extending jacket surface (33).
9. Controllable two-way valve device for an internal combustion engine according to one of Claims 6 through 8, characterized in that the axially extending control surface (27) of the first valve member (24) is embodied as a cylindrical outer jacket (30) whose diameter is smaller than the diameter of the second valve member (25) and a gap (35) is embodied

between an inner wall of the housing (7) and the cylindrical outer jacket (30), which gap is arranged on the side facing away from the first outlet (28).

10. Controllable two-way valve device for an internal combustion engine according to one of Claims 1 through 4 or 6, characterized in that the exhaust gas inlet (41) is arranged between the two exhaust gas outlets (42, 43).
11. Controllable two-way valve device for an internal combustion engine according to Claim 10, characterized in that the distance between two radially extending control surfaces (44, 45) of the first and of the second valve member (39, 40) is equal to the height of the exhaust gas inlet (41) between a first and second valve seat (46, 47), of which the first valve seat (46) encloses the passage between the exhaust gas inlet (41) and the exhaust gas outlet (42) to the bypass channel and the second valve seat (47) encloses the passage between the exhaust gas inlet (41) and the exhaust gas outlet (43) to the exhaust gas cooler.
12. Controllable two-way valve device for an internal combustion engine according to Claim 11, characterized in that the exhaust gas inlet stream is interrupted by means of the resting of the radially extending control surfaces (44, 45) on the valve seats (46, 47), and the axially extending control surface (48) of the first valve member (39) features the same outer diameter as the inner diameter of the two valve seats (46, 47) and features a height that essentially corresponds to the distance between the two valve seats (46, 47), so that optionally the axially extending control surface (48) interacts with one of the two valve seats (46, 47) respectively.